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ABSTRACT

The term "Flow Experiences" refers to periods of deep, intense involvement in activities that challenge but do not overwhelm one's skills. As conceptualized by M. Csikszentmihalyi (1990), Flow represents a distinct state of consciousness that integrates high but effortless concentration, intrinsic motivation, loss of awareness of self and clock time, facile response to challenge, and feelings of competence and freedom. This paper outlines some of the critical issues involved in assessing Flow, along with ways of addressing these issues. It then summarizes a preliminary examination of the validity of an instrument developed to assess activities that provide Flow experiences. One approach to assessing Flow has been the Experience Sampling Method, a naturalistic research method that uses paging devices to capture "snapshots" of momentary experience. Subjects respond about their experiences when they are paged at random. The piloted instrument, the Flow Activities Assessment, uses quoted statements to evoke the Flow experience and identify Flow-related activities. The questionnaire, which considered mathematical and literary activities, was sent to 900 academically talented students attending a summer session sponsored by the Center for Talent Development at Northwestern University (Illinois). Preliminary analysis of responses from 251 students indicate that the instrument discriminates the dominant experiences associated with different activities and helps students assess which activities integrate these experiences toward Flow. As a tool for research the Flow Activities Assessment needs further refinement, but early results support its potential. The instrument is attached. (Contains 1 figure, 3 tables, and 16 references.) (SLD)

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Assessing Flow Experiences in Highly Able Adolescent Learners[1]

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Introduction

Flow Experiences refer to periods of deep, intense involvement in activities that challenge but do not overwhelm one's skills. As conceptualized by Csikszentmihalyi, Flow represents a distinct state of consciousness that integrates high but effortless concentration, intrinsic motivation, loss of awareness of self and clock time, facile responsiveness to challenge, and feelings of competence and freedom. In the state of Flow, people report that they have become so involved in an activity that they lose all track of time, forget their own fatigue, and even their most pressing personal problems. This state is typically experienced in activities that provide clear rules and feedback to performance, and permit a close, flexible calibration between task complexity and individual skills (Csikszentmihalyi, 1990).

Research indicates that virtually any human activity can be structured to enhance Flow Experience, including school subjects and classroom activities typically perceived as boring or worrisome by teenagers . Individual differences in the self-reported frequency and diversity of Flow Experiences are associated with talent-related achievement and subjective commitment to talent development in adolescence, adolescent identity achievement, and adult mental health and creativity. Further research evidence from clinical, family and classroom settings indicates that individuals can learn to increase the frequency and duration of their Flow Experiences even in highly complex activities, leading to improved performance and life satisfaction (Csikszentmihalyi, 1993; Csikszentmihalyi & Csikszentmihalyi, 1988).

This research has spurred interest in the potential contributions of Flow Theory and research to the improvement of methods for detecting and nurturing talent. Yet the assessment of the content and character of Flow experiences poses a range of issues regarding what exactly Flow is and how it might best be measured. These complexities help to account for why assessments of Flow suitable to the placement, counseling and talent profiling of highly able students have been slow to develop. This paper outlines some of the critical issues involved in assessing Flow, along with ways for addressing those issues. It then summarizes a preliminary examination of the validity of one assessment of activities which provide Flow experiences. This *Flow Activities Assessment* is currently being developed and tested at Northwestern University's Center for Talent Development (CTD). The paper concludes by suggesting further steps toward developing this assessment, and potential applications of the instrument in counseling and research.

A Brief Overview of the Theory of Optimal Experience

The theory of Flow or Optimal Experience rests upon a few fundamental propositions about human motivation, supported by evidence from both qualitative and quantitative sources. Here three are cited. First, the theory advances the view that human beings are intrinsically motivated to seek new and challenging experiences, and derive self-sustaining pleasure from the process of testing competencies. In line with the emphases of both Optimal Arousal Theory and White's Theory of Effectance Motivation, early studies of Flow sought to understand the alternative sources of reward that "drive" creative people to go without rest, sleep, food and other creature and social supports (Hunt, 1965; White, 1958). Second, Flow Theory asserts that while human beings engage in myriad activities, the quality of experience which motivates and undergirds that activity exhibits a common structure and order. Thus the answer to Csikszentmihalyi's question about the motive of creative artists emerged as a structure of experience similar to the satisfactions reported by surgeons, athletes, musicians and scholars - a state of immersed attention in which the person sustains an unusually fluid give-and-take with the demands of her activity. In this respect Flow Theory clearly extends the phenomenological tradition of Abraham Maslow, whose typologies of B-Cognition and Peak Experiences are markedly similar to descriptions of Flow (Maslow, 1968).

Third, Flow Theory asserts that the structure and order underlying optimal experiences is dialectical in nature, marked by a dynamic and energizing tension between otherwise antagonistic features of daily experience. At the broadest level, these antagonistic features are identified as species of "integration", denoting tendencies toward constancy, interrelation and constraint, and "differentiation", denoting tendencies toward change, difference and specialization. Flow Theory employs the term "psychological complexity" to characterize their melding and harmonization.

To date Flow Theory has investigated four dimensions of the expression of "complexity": within momentary consciousness, and within the structures of daily activities, social/cultural contexts, and personality. At the level of consciousness, complexity is exhibited in those "Flowing" experiences in which one feels "drawn into" the structure of a moderately demanding activity, yet sufficiently "freed" from distraction to permit the enjoyable deployment of energy and will. In turn, these experiences are facilitated when activities offer clear goals for action and clear feedback to performance, yet also considerable latitude to choose how one will act and control the pace of activity and challenge. Similarly contexts such as school and families help make more Flow experiences possible both by establishing rules and mutual responsibilities, yet also offering their members opportunities to exercise autonomy and self-expression. Finally, human beings socialized within complex social settings develop habits of self-regulation (personality) which combine an openness to new experiences with a capacity to control attention and set self-affirming goals. This personality profile supports and motivates individuals in crafting new sources of psychic order for themselves and others, through the creation of culture and the solution of complex problems (Csikszentmihalyi, 1993).

Consistent with prior dialectical models of human development, including those of Jean Piaget and John Dewey, Flow Theory views the active cultivation of complexity as both the engine of human growth and the motive force behind human creativity. More like Dewey than Piaget, however, it is clear that there is nothing inevitable about the realization of complexity in experience, settings, and personality. Rather, systems, including human systems, tend toward disorder unless complexity is cultivated. For human beings to sustain complexity, they must learn how to "read" and control the quality of their own experiences under conditions of disorder, as well as how to teach others the psychic and disciplinary skills necessary to find interest in domains that do not yield easily to a novice's efforts. It is the evidence that such skills can in fact be learned, and that all disciplines can be made more accessible through attention to the conditions for Flow, that most intrigues educators and fuels interest in the development of instruments for Flow assessment.

Flow and its Measurement

The effort to measure Flow Experiences has been integral to the on-going development of the concept from its inception. Early studies were primarily phenomenological in orientation and qualitative in design. Interviews, open-ended surveys and observational protocols were used to document the cognitive and affective dimensions of Flow states across diverse activities and professions (Csikszentmihalyi, 1975). These studies generated both a taxonomy of Flow percepts and an accompanying taxonomy of situational conditions that support Flow. These included the finding that Flow states coincide with the subjective perception of "match" between one's skills and the difficulties posed by an activity - again, an idea clearly rooted in the Optimal Arousal tradition. In turn, Flow was associated with a positive subjective orientation toward task "challenges" as "opportunities for action" rather than threats or risks. Just how close this "match" needed to be to initiate Flow or how an optimal match was maintained remained only vaguely addressed in the early studies. Nonetheless, the challenge-skill "match" quickly became a central facet of Flow Theory, in part because it succinctly captured the melding of subjectivity and the world of action, and in part because it seemed a short-hand formula for Flow, potentially amenable to fine-tuned modulation and control.

The construct of "match" between challenge and skill became more prominent in the early 1980's with the introduction of the Experience Sampling Method (ESM) to Optimal Experience studies (Csikszentmihalyi & Larson, 1984). ESM is a naturalistic research method employing paging devices to capture "snapshots" of momentary experience across a wide spectrum of human activities and settings. While research designs vary widely, subjects in ESM studies typically carry a pager through the course of a normal week. In response to randomized periodic signals, subjects respond to a battery of questions about their psychic states and activities, using a diary-like "day-book". The resulting data permits analyses within each person's range of responses, between people and groups, and across varied social and behavioral contexts.

For those in Flow studies, ESM offered an exciting combination of ethnographic authenticity and quantitative rigor, permitting the simultaneous observation and measurement of multiple psychic states (e.g. happiness, potency, esteem via Likert or semantic-differential scales). In particular, the method posed an opportunity to specify the match between perceived challenge and skill "precisely" using Likert scales, and allowed the correlates of various ratios between challenge and skill to be examined. Thus ESM measurements of Optimal Experience and psychic complexity took Flow studies in a decidedly quantitative direction. The "ratio" between perceived challenge and skill emerged as one of the primary operational definitions of the Flow situation. By assuming orthogonality between challenge and skill ratings, quadrants of high-low challenge-skill congruence were defined, corresponding to four subjective states critical to the Flow model: Flow (HighC-HighS); Boredom (LowC-HighS); Apathy (LowC-LowS); and Anxiety (HighC-LowS). Eventually these quadrants were further subdivided to as many as sixteen and thirty-two "channels," each representing a somewhat different proportion of challenge to skill.

ESM analyses focused on validating the experiential superiority of the "High-High" channels, as well as specifying subtle variations between them . And in large measure this effort was rewarded. While the various High-High channels varied in terms of concentration, affect, and perceived energy and control, they generally outperformed channels in the other three quadrants in terms of positive experiences. The non-optimal quadrants in turn revealed experience profiles consistent with their theoretical designations (e.g. high boredom in the "Boredom" quadrant). At the same time, anomalies emerged in the data which reintroduced the subjectivity of the respondent into the interpretation of the ESM Flow data, and prompted significant alterations in the theory. For example, the question of how to define the point of origin (i.e. the "0-0" or intersection point) between the challenge and skill scales led to experimentation both with group arithmetic means (i.e. the average of challenge and skill for the entire sample) as well as each person's internal mean level (derived from the mean of each person's responses to the challenge and skill ratings, standardized

as a z-score). The finding that the Flow channel defined by each subject's internal mean score was superior in quality of experience led to the idea that Flow occurs only when both perceived challenge and perceived skill exceed the individual's "normal" or experiential mean (Massimini & Massimo, 1988). This idea of an internal subjective "mean" jived nicely with the Optimal Arousal tradition. But the origins or nature of such a "mean" or threshold have not been further investigated.

In other studies, significant differences were found in the quality of experience associated with the High-High Flow channel between groups of American and Italian high school students, among American high school achievers and underachievers, and between American white collar and blue collar workers (Lefevre, 1988; Nakamura, 1988). In the latter case, blue collar workers reported their highest frequency of High-High experiences at the workplace, with superior concentration, energy and perceived competence. But they were happiest at home, when both challenges and the use of skill were minimal. These studies initiated speculation that both contextual signals (e.g. I'm at work now) and subjective expectations about challenge, success and failure may override the enjoyment of the moment-to-moment parity between challenge and skill.

Implications for the Survey Assessment of Flow Experience and Psychic Complexity

The on-going and interactive development of qualitative and quantitative approaches to Flow studies has resulted in two heady decades of exploration into the psychological and contextual nature of human happiness. Indeed, Flow studies provide one of the most striking examples of productive complimentary between qualitative and quantitative methods in the contemporary social sciences. In turn, a number of attempts to survey Flow activities and measure their characteristics have appeared in the last decade (Clarke & Haworth, 1994; Hoffman & Novak, 1996). These surveys usually incorporate both qualitative and quantitative elements, although the emphases vary according to the aims of the research. Surveys focused on assessing the frequency and intensity of Flow experiences tend to employ Likert and other scaling techniques similar to those modeled in the ESM. These surveys often focus on experiential antecedents and consequences of Flow, inferring the experience of Flow rather than evoking it directly (Webster, Trevino & Ryan, 1993). Other approaches focus directly on the subjective phenomenology of Flow in the process of identifying activities and settings in which it occurs for different individuals. Csikszentmihalyi, Rathunde and Whalen (1993) used four statements evoking dimensions of the Flow state (feelings of intense absorption, effortlessness, intrinsic interest and personal meaningfulness) to identify Flow activities and study their linkage to talents. Privette has used a similar phenomenological approach to explore distinctions between Flow, peak performance and peak experiences (Privette, 1983; Privette & Bundrick, 1987).

Yet the interface between the qualitative and quantitative approaches to Flow studies continues to raise questions about what Flow is, and how it can be evoked, recognized and assessed. For example, is Flow a stable, "all-or-nothing" state formed from dynamic tension between experiential polarities, as early research seemed to suggest? Or does Flow vary in "intensity" as well as frequency, ranging along some continuum from playful attentiveness to deep, profound immersion? Can we infer more or less Flow in people's lives from high levels of percepts such as control or happiness, or a sense of parity between challenge and skill? Or can we only be sure of Flow when people directly report the states of consciousness associated with optimal experience? At the psychometric level, how successfully can we use "real language" terms like Flow or "challenge" to precisely calibrate psychic states?[1] And how can measurement

[1] The word "challenge" is particularly troubling in this regard, both because it can connote threat or opportunity, as well as because it has few cognates in other languages. In the comparative studies with Italian students cited earlier, for example, challenge was translated roughly as "opportunities for action," since no Italian cognate existed. It is

instruments best be structured to richly evoke the dimensions of Flow, yet permit quantitative assessment of the relative importance of Flow activities in a person's life?

These questions have important implications for the design of assessments of Flow that can be used for personal and career counseling, as well as for discerning unusual sensitivity to the psychic rewards available in complex domains like music, mathematics or the visual arts. Here the aims of measurement shift from understanding the nature of Flow, toward identifying activities that provide Flow, build psychic complexity, and suggest especially promising avenues for personal and talent development. As such, the tool of assessment must be able to richly evoke the experience of Flow for the respondent, and guide the respondent to reflect on those activities in which the dimensions of Flow converge most powerfully and memorably.

Description of CTD Flow Activities Assessment

The pilot CTD Flow Activities Assessment (see Appendix A) examined in this paper draws both upon the early phenomenological studies of Flow and the more recent conception of psychological complexity to evoke the Flow state, identify activities associated with that state, and assess the frequency of those activities. Specifically, the instrument uses quoted statements to evoke the Flow experience and identify Flow-related activities. These statements represent aspects of "integration" and "differentiation" linked by prior research both to momentary Flow and talent development. After reflecting on each statement separately, respondents then consider which activities in their lives combine these distinct experiences into a unified experience, and write them down. These activities are seen as the most psychologically complex, combining immediate experiential rewards with high motivation to achieve and explore talents. As such the instrument extends the approach taken by Csikszentmihalyi, Rathunde and Whalen (1993) to the identification of activities linked to complex patterns of experience.

At the mechanical level, the instrument was designed as a 2-page paper-and-pencil instrument. Page 1 asks respondents to list activities that provide six distinct statements associated with Flow and psychological complexity. These statements are:

- "I get so involved in what I'm doing that I lose all track of time."
- "It's important to me that I do this well."
- "This gives me a chance to really express myself."
- "When I do this, it's sometimes as though I know exactly what to do, like things are coming naturally to me."
- "This is so interesting!"
- "This really challenges me to stretch myself and my skills."

Activities are differentiated further by location "in school" or "outside of school." Respondents may list as many activities as they wish under each experience category, and repeat activities across experience categories. They also may omit responses to any experience categories to which no activities apply. On page 2 respondents are asked to list activities that combine all or most of these six experience categories, and estimate how many hours per week they engage in each. Respondents also are queried about conditions that disrupt engagement in these activities, as well as strategies they deploy to avoid distraction and sustain engagement. Finally, respondents are asked to list activities they do for relaxation, apart from sleep, and estimate their weekly time in each of those activities.

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difficult to determine how this variation in terminology may have affected the comparison between American and Italian students.

Research Questions and Methodology

Does the pilot CTD Flow Activities Assessment successfully evoke and identify activities that provide Flow and evidence psychological complexity? The aim of the present research is to investigate the validity of the Assessment in terms of the Flow construct. Three sub-questions are pursued. First, do the activities listed under each of the six statements correspond to similar linkages between specific activities and dominant experiences reported in prior studies of Flow and talented adolescents? A content analysis is undertaken to make this comparison. Second, are the activities listed as combining Flow elements (page/side 2) also frequently mentioned by the same respondents in regard to specific Flow elements (statements, page/side 1)? A frequency analysis of mathematics listings was undertaken linking mentions of math as a "combined" activity with the number of mentions for math across separate Flow elements. Third, does evidence of complexity in specific domains gained through the Flow Activities Assessment correlate with superior experience and motivation in the same domains, captured with independent measures? Two domains - math and writing - were selected for comparative analyses, based upon the availability of independent, domain-specific motivational and experiential measures. In each domain respondents indicating high complexity were identified, and compared with those who did not indicate high complexity.

Description of Other Research Instruments

In addition to the Flow Activities Assessment, measures from two other research instruments are employed in these analyses, most specifically in addressing question three above. An extensive, scannable questionnaire addressed educational training and history, activities and future aspirations in four domains: mathematics, science, literature and writing, and computer science. The survey also gathered personal, parental and family background information. A second questionnaire was an elaboration of an assessment of intrinsic, extrinsic and social motivation first developed by Csikszentmihalyi, Rathunde and Whalen (1993). This survey asked respondents to rate the importance of a series of motive statements to their reasons for pursuing activities in four domains: math, science, writing and reading. Factor analysis was used to derive composite measures of intrinsic and extrinsic motivation in math and intrinsic motivation writing from this survey. All three measures attained Alphas exceeding .90.

Description of Sample

Research packets containing the Flow Activities Assessment and other questionnaires were mailed to 900 academically talented students who had been admitted to one of two 3-week summer sessions offered in 1995 by CTD on the Northwestern University campus. While specific admission criteria for these summer sessions vary across courses, participants must meet or exceed the 90%-ile in a standardized math and/or verbal assessment such as the PSAT or ACT to qualify for admission. The forms were mailed before arrival on campus, and participation in the research project was voluntary. A pilot subsample of 251 (28%) students responded to the Flow Activities Assessment.

White and Asian students with high family incomes predominated in the total summer population (N=900), while African American and Latino students were significantly under-represented (approximately 10% total). Ages for the total population ranged from 10 through 17, with a mean age of 13.4. 54% were male, 46% female. Background characteristics for the subsample (N=251) were similar, although subsample respondents were somewhat more likely to be male (57%) and younger (mean age=13).

Evidence for Content Validity of CTD Flow Activities Assessment

Does the Flow Activities Assessment successfully identify activities in which students experience Flow? Preliminary analyses indicate that the instrument discriminates the dominant experiences associated with different activities, and helps students assess which activities integrate these experiences toward Flow. Table 1 summarizes the most frequently mentioned activities across the six experience categories listed on side 1 of the survey (in and out of school). The distribution of activities corresponds to previous studies of Flow and adolescence (Csikszentmihalyi, 1993; Csikszentmihalyi & Larson, 1984). First, the quintessential "Flow Activities" - sports, music, reading and hobbies - are frequently mentioned in all six experiences. These are the activities which people across cultures and age groups associate with Flow, and which predominate among Flow activities in both ESM, interview and survey studies. Second, math and science were more frequently associated with perceived importance, competence and challenge, while music, athletics, writing and social activities predominated in involvement, self-expression and interest. Again, this concurs with prior findings among adolescents pointing toward similar patterns of experiential imbalance in the arts and sciences. Third, academic subjects were more likely to be associated with optimal experience among the CTD students than among adolescents of normal ability, reflecting their intellectual giftedness and self-selection for CTD academic courses.

Was there substantial correspondence between mentions of an activity as highly complex and Flow-like (listed on side 2) and the frequency of listing of the same activity under specific Flow statements on side 1? In general, the correlation between the number of activities listed with specific statements and the total number of hours spent in highly complex activities was moderately positive but significant (.30, $p<.001$). In the case of mathematics, the 54 individuals who listed math as a highly complex activity also listed math under specific Flow statements 171 times, an average of 3.2 times/person. Figure 1 examines whether the seven most frequent "Flow" activities reported by students on side 2 of the survey actually combine all or most of the experiences presented on side 1. Here the mentions of the activity are not restricted to those who reported high complexity, although the high complexity number is reported above each activity area's total mentions. Four of these complex activity areas - athletics, music, math and writing - also are frequently mentioned by all respondents across the six Flow component experiences on side 1 of the survey. The pattern is particularly consistent in athletics, music and math, while writing lacks only a strong sense of competency motivation. It is also apparent, however, that the seven "Flow Activities" differ considerably in their experience profiles, with specific experiences predominating and perhaps anchoring the overall experience of Flow. Writing amplifies self-expression and absorption, for example, while math is led by effortless (a feature amplified in this talented group). Visual arts also feature self-expression, but go otherwise unmentioned by this academically talented group, even though 49 respondents mentioned art among their "overall" highly complex activities. Finally, in a reversal of this pattern, science was frequently mentioned under individual statements, but was not seen as combining the statements into one complex experience. A closer analysis will be necessary to confirm these patterns (including a close coding check in the case of science).

Evidence for Convergent Validity of CTD Flow Activities Assessment

Side 2 of the Assessment asks students to list activities that combine most or all of the six Flow-related experiences included on side 1. In the case of two of the most frequently mentioned activity areas, math and writing/literary activities, considerable data was available from independent measures regarding motivation, experience and future aspirations. We examined how students listing math or literary activities responded to other measures of engagement in these same activities compared with students who did not list these activities. The analysis revealed extensive

convergence between the CTD Flow Assessment and other measures of engagement and commitment to talent development.

Tables 2A and 2B present the results of these analyses in the case of mathematics. Table 2A summarizes differences among continuous variables, while Table 2B presents differences for categorical variables. In comparison with the majority of respondents (197) who did not report high complexity in math, the 54 high complexity math students reported significantly stronger intrinsic motivation for math, participated more extensively in math clubs and competitions, tended to prefer math over verbal subjects and feel more competent at math, and were considering math-related college majors more seriously. The two groups of students did not differ significantly in their extrinsic motives for pursuing math studies. This combination of future orientation, extra-curricular engagement and strong intrinsic interest is identical to the motivational patterns among students of similar ability reported by Csikszentmihalyi, Rathunde and Whalen (1993), using a combination of ESM and survey measures of psychological complexity in math.

Tables 3A and 3B present the results of these same analyses in the case of writing and related literary activities. (In this case, a clear factor for "extrinsic motivation" did not emerge from the factor analysis of the independent interest inventory). In comparison with the majority of respondents (193) who did not report high complexity in writing, the 58 high complexity writing students reported significantly stronger intrinsic motivation for writing, participated more extensively in writing clubs and competitions, tended to prefer verbal over math/science subjects and felt more competent in verbal activities, and were considering humanities-related college majors more seriously. Thus the same combination of future orientation, extra-curricular engagement and strong intrinsic interest that distinguished the high complexity math students also distinguished the students with high literary complexity.

Prospects for the Further Development and Use of this Assessment

The CTD Flow Activities Assessment is designed to guide students through a process of reflection grounded in Csikszentmihalyi's Theory of Flow Consciousness. This process comprises two phases. In phase one (Side 1 of the survey), students reflect on specific components of optimal experience and intrinsic motivation, and search their experience for related activities. In phase two (Side 2 of the survey), students reflect on activities in their lives in which these six component experiences converge. In this process students are asked to focus on the component experiences themselves, rather than merely taking inventory of the activities listed in phase one. In Flow Theory, these activities that emerge from phase two are termed "complex", because they integrate otherwise opposed psychological tendencies, and open powerful opportunities for growth.

The analyses reported in this paper were meant as a preliminary examination of a fundamental question: Does the CTD Flow Activities Assessment successfully identify activities that provide respondents with Flow experiences and support high levels of psychological complexity? In effect, does it measure Flow? Aspects of content and predictive validity were addressed. The results provided moderate to strong support for the ability of the assessment to evoke Flow and identify complex activities. Activities listed under specific Flow statements were consistent with prior research into the experiential profiles of school-related and leisure activities (Csikszentmihalyi & Larson, 1984). Activities listed as highly complex were generally well represented under the specific Flow-related statements on the first side of the Assessment. And mentions of high complexity in mathematics and literary activities were strongly and consistently correlated with independent measures of engagement, motivation and future aspiration in the same subject areas.

There was also variability and some inconsistency between responses to the first and second sides of the Assessment, warranting more thorough examination of its theory and format.

Some of this variability may derive from coding error, and in particular, the absence of science from mentions of activities that combine the Flow elements. Some of the inconsistencies may derive from "delayed memory" for activities that were forgotten while completing side 1, but came to mind when thinking about the combined effect of the Flow elements. This may have played a role in the low frequency of mentions of art across the Flow elements, since the sample is skewed in the direction of academic talent, and respondents were completing the form in relation to an academic enrichment program. On the other hand, the differences in experiential profiles among different activity areas could help shed further light on the composition of Flow experiences in different disciplines, especially regarding which dimensions of experience are most critical to initiating Flow states. In this analysis, opportunities for experiencing self-expression seemed critical to visual arts, while the sense of competence was prominent in mathematics.

Other aspects of variability could provide valuable information relevant to the talent development and psychsocial growth of teenagers. Visual examination of the protocols recovered in the pilot year revealed substantial diversity in the number of activities listed, the degree to which the six Flow-related experiences were present in students' lives, and the distribution of Flow-like experiences within and outside the school day. Some protocols were jammed with activities, suggesting a teenager with many sources of optimal experience but also many choices to make about career options and prioritization of time. Other protocols were either generally sparse, or lacked sources of optimal experience during or outside of school. These details and patterns could be used to structure a follow-up protocol exploring a student's investment of time and energy in her most complex activities. They also could form the basis of a counseling strategy that would build a conversation about talent and career development from a shared foundation of knowledge about a student's most intense interests and passions. Even the sparsest protocols returned during the pilot year contained some response that could yield insight into the Flow experience most familiar to the respondent, and the activity associated with it. In the case of some highly engaged students, the protocol revealed certain "gaps" in their profile of psychological rewards that could be critical to their long-term health and happiness. The Assessment could help improve career clarification processes across all experiential profiles, by encouraging teenage students (and their parents and counselors) to integrate experiential considerations into their career goals, and prioritize quality of experience as a factor in life and career decisions. Work is now underway to develop a more refined and detailed version of the Assessment that will query the respondent in greater detail about their most complex activities, and spur reflection about potential links between the experience of those activities, talent development, and career goals.

As a tool for research the Flow Activities Assessment clearly needs further refinement. Yet the results reported here indicate that statements drawn directly from the phenomenology of Flow experience can be used effectively to identify "true Flow", both in terms of activities that produce it, and in terms of the people who experience more or less of it, in general and within specific domains. In particular, the phenomenological approach appears to evoke successfully the elements of Flow experience in a way that permits accurate reflection on activities which integrate these elements most powerfully. This stands somewhat in contrast to other operational definitions of Flow such as "parity between challenge and skill", in which the subjective and experiential features of the definition are assumed rather than directly invoked. The Assessment should prove particularly helpful in future studies of Flow and its developmental consequences in specific domains like mathematics or music. The format of the survey can be tailored to target specific disciplines, including categories of activity related to practice, performance and personal enjoyment. While the present Assessment permits two primary forms of quantitative data - activity counts and frequency (hours) of involvement - the format could also include ratings of the intensity of certain Flow elements (e.g. how deeply immersed one becomes), or its perceived importance to the individual (e.g. how dispensable the respondent feels the activity is in relation to his psychic well-being). In conclusion, an approach to assessment combining the phenomenology of Flow with quantitative elements provides the researcher with assurance that the data obtained bears directly upon the nature and consequences of Flow and psychological complexity.

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Table 1: Most Frequently Mentioned Activities Associated with the Six Experiential Dimensions Included on the CTD Flow Activities Assessment

Experiential Dimension	Activities in School	Mentions	Activities Outside School	Mentions
"I get so involved in what I'm doing that I lose all track of time."	English Math Science Athletics Writing	56 41 41 24 26	Athletics Literature/Writing Music Computing	104 101 40 38
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
"This gives me a chance to really express myself."	Writing Art Music Math English	89 39 32 20 20	Music Literature/Writing Athletics	64 57 42
"I know exactly what to do, like things are coming naturally to me."	[illegible] Science	[illegible] 48	[illegible] Literature/Writing Music Computing	[illegible] 44 32 30
"This is so interesting!"	Math Science Social Studies English	74 106 36 33	Literature/Writing Athletics Computing Music	65 51 36 37
"It really challenges me to stretch myself and my skills."	[illegible] Science Homework Writing	[illegible] 39 23 29	Athletics Music Literature/Writing	83 43 23

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Figure 1: Do the "Flow" Activities Listed on Side Two of the Questionnaire Actually Combine All or Most of the Individual Elements?

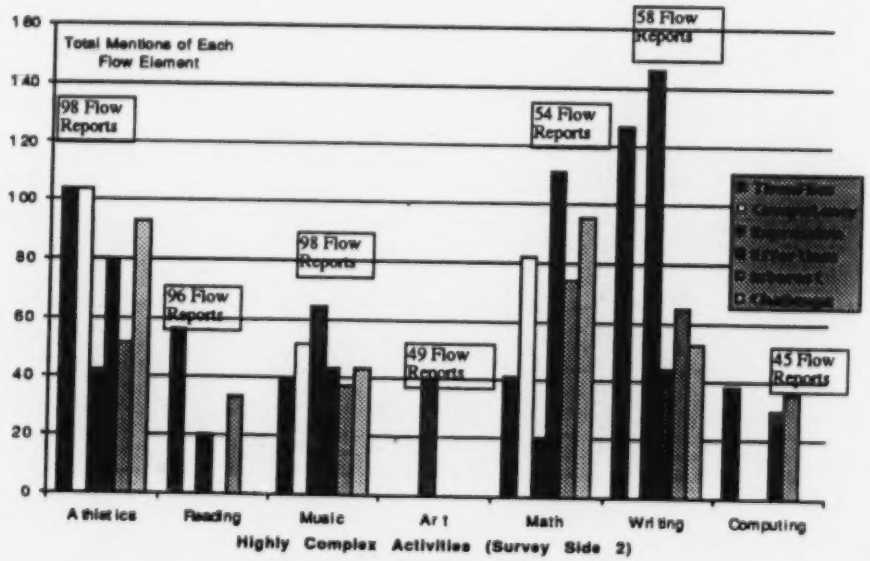

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Table 2A: Comparing 1995 CTD summer students who report high psychological complexity in Mathematics and students who do not report high psychological complexity in Mathematics: Continuous Measures of Engagement and Aspiration (Means and Standard Deviations)
(* p<.05; ** p<.01; *** p<.001)

Measure	Complexity in Math (N=50)	No Complexity in Math (N=197)	t-value (1-tailed)
Intrinsic Motivation in Math	5.18 (1.05)	4.23 (1.06)	5.31***
Extrinsic Motivation in Math	3.47 (1.42)	3.25 (1.44)	.93
Perceived Importance of Math to Adult Career	4.88 (.33)	4.49 (.73)	5.79***
Expected Number of Years of Study of Math	4.08 (1.8)	4.16 (2.2)	-.23

Table 2B: Comparing 1995 CTD summer students who report high psychological complexity in Mathematics and students who do not report high psychological complexity in Mathematics: Categorical Measures of Engagement and Aspiration (* p<.05; ** p<.01; *** p<.001)

Measure	Complexity in Math (N=50)	No Complexity in Math (N=197)	χ²
Preference for Math or Verbal			
Prefers Verbal	9%	21%	8.22*
Prefers Math/Science	68%	46%	
No Preference	23%	33%	
Better at Verbal than Math			
Better at Verbal	6%	16%	9.20**
Better at Math/Science	66%	43%	
No Difference	28%	41%	
Considering Engineering Major			
Yes	37%	23%	3.89*
No	63%	77%	
Considering Math Major			
Yes	37%	20%	6.38*
No	63%	80%	
Considering Science Major			
Yes	63%	52%	2.41
No	37%	48%	
Math Competitions			
Yes	73%	59%	3.34
No	27%	41%	
Member of a Math Club			
Yes	52%	76%	15.1***
No	48%	24%	

Table 3A: Comparing 1995 CTD summer students who report psychological complexity in Literary Activities and students who do not report psychological complexity in Literary Activities: Continuous Measures of Engagement and Aspiration (Means and Standard Deviations)
(* p<.05; ** p<.01; *** p<.001)

Measure	Complexity in Literacy (N=50)	No Complexity in Literacy (N=199)	t-value (1-tailed)
Intrinsic Motivation in Writing	5.25 (.57)	3.78 (1.53)	7.10***
Hours/Week Writing for Pleasure	3.22 (2.48)	1.59 (2.27)	4.72***
Hours/Week in Literary Club Activities	2.06 (2.67)	.84 (1.70)	3.20**
Intrinsic Motivation in Reading	4.65 (1.09)	4.30 (1.27)	1.90*
Hours/Week Writing for Pleasure	6.63 (2.78)	5.87 (2.89)	1.76*

Table 3B: Comparing 1995 CTD summer students who report psychological complexity in Literary Activities and students who do not report psychological complexity in Literary Activities: Categorical Measures of Engagement and Aspiration (* p<.05; ** p<.01; *** p<.001)

Measure	Complexity in Literacy (N=50)	No Complexity in Literacy (N=199)	χ²
Preference for Math or Verbal			
Prefers Verbal	47%	13%	39.7***
Prefers Math/Science	19%	56%	
No Preference	34%	31%	
Better at Verbal than Math			
Better at Verbal	37%	10%	34.1***
Better at Math/Science	15%	53%	
No Difference	48%	37%	
Considering Arts Major			
Yes	24%	10%	7.8**
No	76%	90%	
Considering Humanities Major			
Yes	44%	7%	55.1***
No	56%	93%	
Writing Competitions			
Yes	93%	87%	1.54
No	7%	13%	
Member of a Writing Club			
Yes	57%	43%	3.96*
No	43%	57%	

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CTD Student's Name: _____

Reflect on each of the statements listed below. Are there activities or relationships in your life now that give you the experiences described in each statement? ***(Please note: You can list more than one activity for each statement, and repeat activities if they apply to more than one statement below.)***

1. ***"I get so involved in what I'm doing that I lose all track of time."***

Activities in School: Activities Outside of School:

2. ***"It's important to me that I do this well."***

Activities in School: Activities Outside of School:

3. ***"This gives me a chance to really express myself."***

Activities in School: Activities Outside of School:

4. ***"When I do this, it's sometimes as though I know exactly what to do, like things are coming naturally to me."***

Activities in School: Activities Outside of School:

5. ***"This is so interesting!"***

Activities in School: Activities Outside of School:

6. ***"This really challenges me to stretch myself and my skills."***

Activities in School: Activities Outside of School:

continued on the other side of page....

1. I lose track of time. 2. It's important to me. 3. I can express myself.
4. I know exactly what to do. 5. It's interesting. 6. It's challenging.

7. ***Are there activities or relationships in your life in which all or most of these experiences (1 through 6 above) combine or come together at the same time? Write those activities below, and circle the number of hours per week you usually spend doing each activity.***

Activity or Area of Study:	Hours per Week You Spend Doing This:
1. _____	1 2 3 4 5 6 7 8 9 10 11 12
2. _____	1 2 3 4 5 6 7 8 9 10 11 12
3. _____	1 2 3 4 5 6 7 8 9 10 11 12
4. _____	1 2 3 4 5 6 7 8 9 10 11 12
5. _____	1 2 3 4 5 6 7 8 9 10 11 12

8. ***What happens in your life that disrupts these experiences or keeps them from happening more often?***

9. ***Have you learned any "tricks" or strategies for helping these experiences come together in your life more often?***

10. ***Apart from sleeping or resting, how do you most like to relax? List these activities or situations, and circle the number of hours per week you usually spend doing each activity or situation.***

Activity:	Hours per Week You Spend Doing This:
1. _____	1 2 3 4 5 6 7 8 9 10 11 12
2. _____	1 2 3 4 5 6 7 8 9 10 11 12
3. _____	1 2 3 4 5 6 7 8 9 10 11 12
4. _____	1 2 3 4 5 6 7 8 9 10 11 12
5. _____	1 2 3 4 5 6 7 8 9 10 11 12